



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification<sup>4</sup> : <b>G02C 11/00, A61M 15/08</b></p>	<p><b>A1</b></p>	<p>(11) International Publication Number: <b>WO 87/ 03704</b> (43) International Publication Date: <b>18 June 1987 (18.06.87)</b></p>
<p>(21) International Application Number: <b>PCT/US86/02661</b> (22) International Filing Date: <b>10 December 1986 (10.12.86)</b> (31) Priority Application Number: <b>808,615</b> (32) Priority Date: <b>13 December 1985 (13.12.85)</b> (33) Priority Country: <b>US</b> (71)(72) Applicants and Inventors: <b>TIMMONS, John, W. [US/US]; TIMMONS, Gloria, A. [US/US]; 6950 West Country Club Drive, Sarasota, FL 33580 (US).</b> (74) Agent: <b>PRESCOTT, Charles, J.; 2033 Wood Street, Suite 115, Sarasota, FL 33577 (US).</b> (81) Designated States: <b>AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK, FL, FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent),</b></p>		<p>NL (European patent), NO, RO, SD, SE (European patent).  <b>Published</b> <i>With international search report.</i> <i>With amended claims.</i></p>
<p>(54) Title: <b>EYEGASS FRAME AND NASAL CANNULA ASSEMBLY</b></p> <div data-bbox="440 1140 1247 1528" data-label="Image"> </div> <p>(57) Abstract</p> <p>An improved eyeglass frame (30) and nasal cannula assembly for inconspicuously administering oxygen or other gases into the nostrils of a patient having respiratory ailments. The eyeglass frame (30) has a pair of grooves (38 and 38') in the rear surface of its front piece and a groove in the interior surface of each of its hinged temples. The nasal cannula assembly includes a pair of cannula tubes (40) fitted in these grooves (38' and 40). The nasal portion (10) of each of the cannula tubes (40) is adapted for insertion in one nostril of the patient's nose while the end of the free portion of each cannula tube (40) is connectable to a portable or stationary source of oxygen or other gas to be administered to the patient. The lower end (14) of the nasal portion (10) is shaped for retention in the user's nostril by a gentle gripping action of the ala of the nostril and also shaped for improved functioning and comfort. The entire nasal portion (10) of the cannula tube (40), including the shaped lower end (14), is replaceable. To improve comfort and retention of the lower end (14) of the nasal portion (10) in the user's nostril, the groove (34 and 34') in the nosepiece of the eyeglass frame (30) is shaped to redirect the lower end (14) of the nasal portion (10) downwardly and inwardly toward the nostril. The overall appearance of the eyeglass frame (30) is substantially identical to that of a conventional eyeglass frame and all but a small portion of the cannula tubes (40) are hidden from view.</p>		

***FOR THE PURPOSES OF INFORMATION ONLY***

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	ML	Mali
AU	Australia	GA	Gabon	MR	Mauritania
BB	Barbados	GB	United Kingdom	MW	Malawi
BE	Belgium	HU	Hungary	NL	Netherlands
BG	Bulgaria	IT	Italy	NO	Norway
BJ	Benin	JP	Japan	RO	Romania
BR	Brazil	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	LI	Liechtenstein	SN	Senegal
CH	Switzerland	LK	Sri Lanka	SU	Soviet Union
CM	Cameroon	LU	Luxembourg	TD	Chad
DE	Germany, Federal Republic of	MC	Monaco	TG	Togo
DK	Denmark	MG	Madagascar	US	United States of America
FI	Finland				

-1-

**EYEGLOSS FRAME AND NASAL CANNULA ASSEMBLY****TECHNICAL FIELD**

This invention relates generally to the administering of oxygen or other gases to a patient having respiratory ailments, and more particularly to improvements in an eyeglass frame and nasal cannula assembly for inconspicuously administering such gases comfortably into the nostrils of such a patient.

**BACKGROUND ART**

Certain respiratory ailments require the administering of oxygen or other gases to a patient over an extended period of time. Nasal cannula assemblies for administering oxygen or other gases to a patient having such respiratory ailments are well known in the prior art. However, the use of prior art nasal cannula assemblies in public can be embarrassing to many patients. Accordingly, many ambulatory patients who would otherwise be capable of dining in restaurants, attending plays, movies or sports events, visiting friends or relatives or otherwise participating in activities away from their homes will often confine themselves to their homes to avoid embarrassment.

Notwithstanding numerous developments relating to nasal cannula assemblies, it is not believed that the prior art provides a nasal cannula assembly for inconspicuously administering oxygen or other gases into the nostrils of a patient having respiratory ailments. Furthermore, it is not believed that the prior art provides an eyeglass frame and nasal cannula assembly other than applicant's prior invention discussed below. Yet, an eyeglass frame and nasal cannula assembly could be used for inconspicuously administering oxygen or other gases into the nostrils of a patient having respiratory ailments. Further, no references are known in conjunction with eyeglass frames for delivery

-2-

of oxygen through a nasal cannula having a replaceable nasal portion.

Applicants also cite their soon to be issued U.S. Patent No. 4,559,941 having an issue date of December 24, 1985 in which is disclosed and claimed the basic eyeglass frame and cannula assembly structure upon which the present invention is an improvement.

#### DISCLOSURE OF INVENTION

The present invention is directed to an improved eyeglass frame and nasal cannula assembly for inconspicuously administering oxygen or other gases into the nostrils of a patient having respiratory ailments. The eyeglass frame has a pair of grooves in the rear surface of its front piece and a groove in the interior surface of each of its hinged temples. The nasal cannula assembly includes a pair of cannula tubes fitted in these grooves. The nasal portion of each of the cannula tubes is adapted for insertion in one nostril of the patient's nose while the end of the free portion of each cannula tube is connectable to a portable or stationary source of oxygen or other gas to be administered to the patient. The lower end of the nasal portion is shaped for retention in the user's nostril by a gentle gripping action of the ala of the nostril and also shaped for improved functioning and comfort. The entire nasal portion of the cannula tube, including the shaped lower end is replaceable. To improve comfort and retention of the lower end of the cannula tube in the user's nostril, the groove in the nosepiece of the eyeglass frame is shaped to redirect the lower end of the cannula tube downwardly and inwardly toward the nostril. The overall appearance of the eyeglass frame is substantially identical to that of a conventional eyeglass frame and all but a small portion of the cannula tubes are hidden from view.

-3-

It is therefore an object of this invention to provide an improved eyeglass frame and nasal cannula assembly for both inconspicuous administration of oxygen or other gases into the nostrils of a patient having respiratory ailments and for improved retention, comfort, and functioning of the lower end of the nasal portion of each cannula tube in relation to the user's nostrils.

It is another object to provide the above invention having the nasal portion of each cannula tube which interacts with the user's nostrils replaceable.

It is yet another object of the above invention to provide improved groove structure in the nosepiece of the eyeglass frame for retaining and redirecting the nasal portion of the cannula tube toward the user's nostril for further increased comfort and retention.

In accordance with these and other objects which will become apparent hereinafter, the instant invention will now be described with reference to the accompanying drawings in which:

#### BRIEF DESCRIPTION OF THE DRAWINGS

20 Figure 1 is a rear elevation view of the improved eyeglass frame and nasal cannula assembly with the temples of the eyeglasses removed.

Figure 2 is a perspective view of the replaceable nasal portion of the cannula tube.

25 Figure 3 is a section view in the direction of arrows 3-3 in Figure 1.

-4-

Figure 4 is a section view in the direction of arrows 4-4 in Figure 1.

#### BEST MODE FOR CARRYING OUT THE INVENTION

Referring now to the drawings, and particularly to Figures 1 and 2, the front piece of the eyeglass frame is shown generally at 30 and is depicted with the hinged temples removed. The general appearance of the eyeglass frame and front piece 30 is substantially identical to that of a typical conventional plastic eyeglass frame and may be varied to accommodate style change and preferences. For example, various masculine and feminine models can be provided in a product line. Additionally, prescription lenses can be used with the eyeglass frame if desired.

The front piece 30 includes lenses 50 and 52 secured therein and having a center bridge portion integrally formed with the portions of the front piece 30 which surround the lenses 50 and 52. Although not shown, each of the temples has an essentially straight, elongated portion which extends rearward from the front piece along the side of the user's face and a downwardly curved portion which fits behind the user's ear to retain the eyeglass frame in position for use. Each of the temples is connected to the front piece by a hinge positioned near the outer margins of the front piece as shown and connected in a well known manner.

The rear surface of the front piece 30 shown in Figure 1 has an identical pair of grooves each including groove portion 38 and 38' above the lens, enlarged groove portions 36 and 36' at the upper inner corners of the lenses adjacent the bridge, and nose piece groove portions 34 and 34' which are within or adjacent the nose piece 32 and 32'.

Each cannula assembly includes a replaceable nasal

-5-

portion 10 best seen in Figure 2, a mid-portion 40, and a free portion (not shown). The mid-portion 40 interconnects to the connector portion 22 of the nasal portion 10 in Figure 2 and extends rearwardly along the length of the 5 grooved temples and are connectable to a small bottle or other portable or stationary source of oxygen or other gas to be administered to the user into his nostrils. If desired, a portable or stationary source of oxygen can be concealed from view under a coat or other similar item of 10 the user's clothing.

The replaceable nasal portion 10, shown best in Figure 2, includes an elongated main tubular portion 12, a reduced-diameter connector portion 22 at one end with an adjacent enlarged-diameter collar 20 to assist in assembly to the 15 mid-portion 40 of the cannula assembly. The lower end of the replaceable nasal portion 10 includes a curved portion 14 bending through more than 180 degrees of curvature as shown followed by a recurve or reverse bend at 16 and a relative straight portion 18 at the distal end. Gases pass 20 through the inner passage 24 discharging at distal end portion 18 into the user's nostrils.

An important aspect of the contour depicted at the lower end of the replaceable nasal tube 10 is that it will not only introduce oxygen into the user's nostril, but will 25 also gently grip the ala of the nostril by the spring bias action created by this unique contour. Because the material is fabricated of relatively soft and pliable plastic material, this gripping action produces a relatively comfortable positioning force on the ala of the nostril.

30 There are other important functional aspects of this unique shape in the lower end of the nasal portion 10. As curved portion 14 is opened somewhat to increase the gap between 16 and the opposing tube portion to accommodate the

-6-

tissue thickness of the ala, straight portion 18 becomes angled away from the inner tissue surface of the ala. This also insures that the distal end cannot contact the inner surface tissue. Therefore by this means, no tissue  
5 irritation is caused by contact with the harsh distal end, the flow of oxygen is better directed into the nostril for use, and mucus will be far less likely to collect in and block the distal end.

Another important aspect of this invention is the  
10 contour of the nosepiece groove portions 34 and 34' of the nosepiece 32 and 32' at 42. As seen in Figure 1, this nosepiece groove portion 34 and 34' is contoured and shaped so as to redirect the lower ends of the replaceable nasal portion 10 downwardly and inwardly toward the user's  
15 nostrils. By this means, virtually all of the natural spring bias action of the main elongated portion 12 which tends to pull the lower end contour portion away from the nostrils is eliminated. These lower end portions of the replaceable nasal portion 10 are thereby positioned  
20 precisely for comfortable, untensioned insertion into the user's nostrils, regardless of the breadth of nose. These nosepiece groove portions 34 and 34' are also easily adapted in shape at 42 and 42' so as to provide a custom and precise fit for each user.

25 Referring to Figure 3, the nosepiece groove 34 in the nosepiece 32 is wedge-shaped so that, as the mid-portion 12 is squeezeably inserted therein, wedging action retains the mid-portion 12 therein.

Referring to Figure 4, the enlarged mid-portion 36 and  
30 36' of the front piece grooves are provided so that the assembly-assisting enlarged collar 20 may be received for concealment to the same degree as the rest of the cannula tube.



-7-

While the instant invention has been shown and described herein in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the  
5 invention, which is therefore not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent and articles.

-8-

## CLAIMS

What is Claimed is:

1. In an eyeglass frame with a concealed nasal cannula assembly, said eyeglass frame having a front piece and a pair of hinged temples, said front piece having a groove in its rear surface for receiving the mid-portion of said cannula assembly, the improvement comprising:  
shaped means integrally formed in the lower end of the nasal portion of said cannula assembly for retaining said lower end in the user's nostril by gentle spring biased gripping of the ala of the nostril.
2. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:  
said shaped means is also for improved oxygen delivery into the user's nostril.
3. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:  
said shaped means is also for preventing irritating contact between the distal end of said nasal portion and the inner surface of the nostril.
4. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:  
said shaped means is also for preventing mucus buildup in the distal end of said nasal portion.
5. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:  
said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed generally parallel to and in the opposite direction to the straight portion of said nasal portion.
6. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:  
said nasal portion is separate and replaceable and

-9-

connectable to the mid-portion of said cannula assembly;

said groove is adapted to also receive the connector between said nasal portion and said cannula assembly.

7. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:

the portion of said groove in the nosepiece of said front piece is shaped to direct said lower end of said nasal portion inwardly toward the ala of the user's nostril whereby retention, user comfort, and unobtrusiveness of said nasal portion are enhanced.

8. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 7, wherein:

said portion of said groove in said nosepiece has a V-shaped cross section for releaseable retention of said nasal portion.

9. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 2, wherein:

said shaped means is also for preventing irritating contact between the distal end of said nasal portion and the inner surface of the nostril;

said shaped means is also for preventing mucus buildup in said distal end of said nasal portion;

said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed generally parallel to and in the opposite direction to the straight portion of said nasal portion;

said nasal portion is separate and replaceable and connectable to said cannula assembly;

said groove adapted to also receive the connector between said nasal portion and said cannula assembly;

the portion of said groove in the nosepiece of said front piece shaped to direct said lower end of said nasal portion inwardly toward the ala of the user's nostril whereby retention, user comfort, and unobtrusiveness of said nasal portion are enhanced;

-10-

said portion of said groove in said nosepiece has a V-shaped cross section for releaseable retention of said nasal portion.

10. An improved eyeglass frame with a concealed nasal  
5 cannula assembly comprising:

an eyeglass frame having a front piece and a pair of hinged temples, said front piece having a pair of lenses surrounding and retaining members separated by an integrally formed bridge, each of said lenses surrounding and retaining  
10 members having an integrally formed nosepiece, and a pair of grooves in its rear surface, each of said grooves commencing near one of said hinged temples, following the contour of the upper portion of one of said lenses surrounding and retaining members, running through said bridge, running  
15 between one of said nosepieces and the lens opening of one of said lenses surrounding and retaining members, and terminating below said nosepieces, and each of said temples having an elongated portion, a downwardly curved portion and a groove in its interior surface, said grooves commencing  
20 near said front piece, running along the length of said elongated portion and said downwardly curved portion, and terminating at the tip of said downwardly portion;

a pair of identical cannula tubes, each of cannula tubes having shaped means integrally formed in the lower end  
25 of said cannula tube for retaining said lower end in the user's nostril by gentle spring-biased gripping of the ala of the nostril, and each of said cannula tubes being fitted in one of said grooves in the rear surface of said front piece and one of said grooves in the interior surface of  
30 said temples whereby the portions of said cannula tubes fitted into said grooves are concealed.

11. In an eyeglass frame with a concealed nasal cannula assembly including a pair of identical cannula tubes, said eyeglass frame having a front piece and a pair  
35 of hinged temples, said front piece having a pair of grooves in its rear surface each for receiving the mid-portion of

-11-

one said cannula tube, the improvement comprising:

shaped means integrally formed in the lower end of the nasal portion of said cannula tube for retaining said lower end in the user's nostril by gentle spring biased gripping  
5 of the ala of the nostril.

12. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means is also for improved oxygen delivery into the user's nostril.

10 13. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means is also for preventing irritating contact between the distal end of said nasal portion and the inner surface of the nostril.

15 14. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means is also for preventing mucus buildup in the distal end of said nasal portion.

20 15. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed generally parallel to and in the opposite direction to the  
25 straight portion of said nasal portion.

16. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said nasal portion is separate and replaceable and connectable to the mid-portion of said cannula tube;

30 said groove is adapted to also receive the connector between said nasal portion and said mid-portion of said cannula tubes.

17. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

35 the portion of said groove in the nosepiece of said front piece is shaped to direct said lower end of said nasal

-12-

portion inwardly toward the ala of the user's nostril whereby retention, user comfort, and unobtrusiveness of said nasal portion are enhanced.

18. An eyeglass frame with a concealed nasal cannula  
5 said portion of said groove in said nosepiece has a V-shaped cross section for releaseable retention of said nasal portion.

19. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 12, wherein:

10 said shaped means is also for preventing irritating contact between the distal end of said nasal portion and the inner surface of the nostril;

said shaped means is also for preventing mucus buildup in said distal end of said nasal portion;

15 said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed generally parallel to and in the opposite direction to the straight portion of said nasal portion;

20 said nasal portion is separate and replaceable and connectable to said cannula assembly;

said groove adapted to also receive the connector between said nasal portion and said cannula assembly;

the portion of said groove in the nosepiece of said  
25 front piece shaped to direct said lower end of said nasal portion inwardly toward the ala of the user's nostril whereby retention, user comfort, and unobtrusiveness of said nasal portion are enhanced;

said portion of said groove in said nosepiece has a V-  
30 shaped cross section for releaseable retention of said nasal portion.

20. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:

said shaped means includes a bend in said lower end of  
35 said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is generally

-13-

directed away from the inside surface of the ala and toward the center of the user's nostril when said cannula assembly is installed for use. and in the opposite direction to the straight portion of said nasal portion.

- 5        21. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

      said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is generally  
10 directed away from the inside surface of the ala and toward the center of the user's nostril when said cannula assembly is installed for use. and in the opposite direction to the straight portion of said nasal portion.

## AMENDED CLAIMS

[received by the International Bureau on 11 May 1987 (11.05.87);  
original claims 10-21 replaced by new claims 10-27; other claims unchanged (5 pages)]

said portion of said groove in said nosepiece has a V-shaped cross section for releasable retention of said nasal portion.

10. An improved eyeglass frame with a concealed nasal cannula assembly comprising:

5 an eyeglass frame having a front piece and a pair of hinged temples, said front piece having a pair of lens surrounding and retaining members separated by an integrally formed bridge, each of said lens surrounding and retaining members having an integrally formed nosepiece, and a pair of  
10 grooves in its rear surface, each of said grooves commencing near one of said hinged temples, following the contour of the upper portion of one of said lens surrounding and retaining members, running through said bridge, running between one of said nosepieces and the lens opening of one  
15 of said lens surrounding and retaining members, and terminating below said nosepieces;

a pair of identical cannula tubes, each of cannula tubes having shaped means integrally formed in the lower end of said cannula tube for retaining said lower end in the  
20 user's nostril by gentle spring-biased gripping of the ala of the nostril, and each of said cannula tubes being fitted in one of said grooves in the rear surface of said front piece whereby the portions of said cannula tubes fitted into said grooves are concealed.

25 11. In an eyeglass frame with a concealed nasal cannula assembly including a pair of identical cannula tubes, said eyeglass frame having a front piece and a pair of hinged temples, said front piece having a pair of grooves in its rear surface each for receiving the mid-portion of  
30 one said cannula tube, the improvement comprising:

shaped means integrally formed in the lower end of the nasal portion of said cannula tube for retaining said lower end in the user's nostril by gentle spring biased gripping of the ala of the nostril.

35 12. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means is also for improved oxygen delivery into the user's nostril.



13. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means is also for preventing irritating contact between the distal end of said nasal portion and the 5 inner surface of the nostril.

14. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means is also for preventing mucus buildup in the distal end of said nasal portion.

10 15. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed 15 generally parallel to and in the opposite direction to the straight portion of said nasal portion.

16. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said nasal portion is separate and replaceable and 20 connectable by a connector to the mid-portion of said cannula tube;

said groove is adapted to also receive the connector between said nasal portion and said mid-portion of said cannula tubes.

25 17. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

the portion of said groove in the nosepiece of said front piece is shaped to direct said lower end of said nasal portion inwardly toward the ala of the user's nostril 30 whereby retention, user comfort, and unobtrusiveness of said nasal portion are enhanced.

18. An eyeglass frame with a concealed nasal cannula

said portion of said groove in said nosepiece has a V-shaped cross section for releaseable retention of said nasal 35 portion.

19. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 12, wherein:

said shaped means is also for preventing irritating contact between the distal end of said nasal portion and the

inner surface of the nostril;

said shaped means is also for preventing mucus buildup in said distal end of said nasal portion;

said shaped means includes a bend in said lower end of  
5 said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed generally parallel to and in the opposite direction to the straight portion of said nasal portion;

said nasal portion is separate and replaceable and  
10 connectable to said cannula assembly;

said groove adapted to also receive the connector between said nasal portion and said cannula assembly;

the portion of said groove in the nosepiece of said front piece shaped to direct said lower end of said nasal  
15 portion inwardly toward the ala of the user's nostril whereby retention, user comfort, and unobtrusiveness of said nasal portion are enhanced;

said portion of said groove in said nosepiece has a V-shaped cross section for releaseable retention of said nasal  
20 portion.

20. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 1, wherein:

said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by  
25 a reverse bend such that said distal end is generally directed away from the inside surface of the ala and toward the center of the user's nostril when said cannula assembly is installed for use and in the opposite direction to the straight portion of said nasal portion.

30 21. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 11, wherein:

said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by  
35 a reverse bend such that said distal end is generally directed away from the inside surface of the ala and toward the center of the user's nostril when said cannula assembly is installed for use and in the opposite direction to the straight portion of said nasal portion.

22. In an eyeglass frame with a concealed nasal

cannula assembly, said eyeglass frame having a front piece and a pair of hinged temples, said front piece having a groove in its rear surface for receiving the mid-portion of said cannula assembly, the improvement comprising:

5       a replacable nasal portion having an elongated flexible tubular portion adapted at its first end to be connectable to the main portion of the cannula assembly;

shaped means integrally formed in the lower second end of said nasal portion for retaining said lower end in the  
10 user's nostril by gentle spring biased gripping of the ala of the nostril.

23. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 22, wherein:

said shaped means is also for improved oxygen delivery  
15 into the user's nostril.

24. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 22, wherein:

said shaped means is also for preventing irritating contact between the distal end of said nasal portion and the  
20 inner surface of the nostril.

25. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 22, wherein:

said shaped means is also for preventing mucus buildup in the distal end of said nasal portion.

25       26. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 22, wherein:

said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed  
30 generally parallel to and in the opposite direction to the straight portion of said nasal portion.

27. An eyeglass frame with a concealed nasal cannula assembly as set forth in Claim 23, wherein:

said shaped means is also for preventing irritating  
35 contact between the distal end of said nasal portion and the inner surface of the nostril;

said shaped means is also for preventing mucus buildup in said distal end of said nasal portion;

said shaped means includes a bend in said lower end of

said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is disposed generally parallel to and in the opposite direction to the straight portion of said nasal portion.

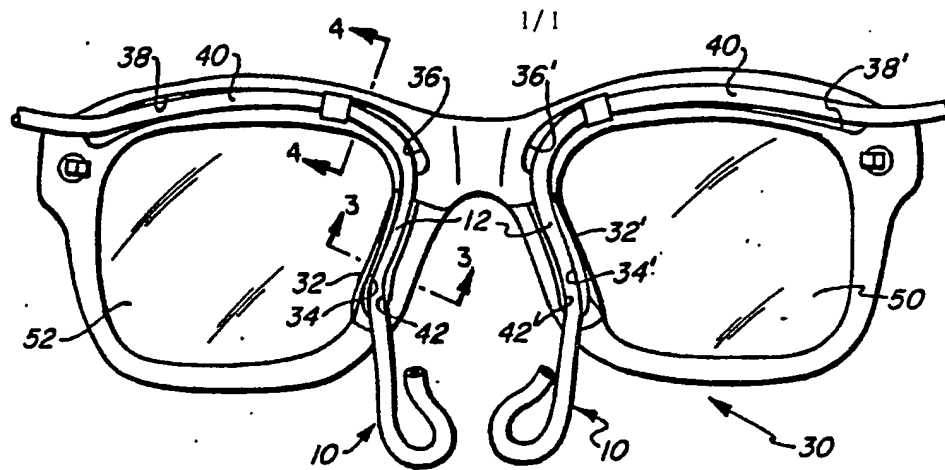
5       said nasal portion is separate and replacable and connectable to said cannula assembly.

          said groove adapted to also receive the connector between said nasal portion and said cannula assembly;

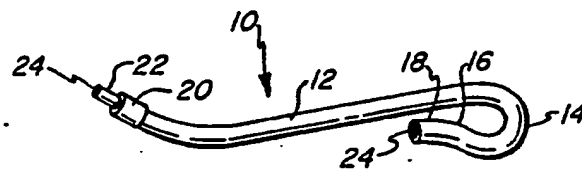
          the portion of said groove in the nosepiece of said  
10 front piece shaped to direct said lower end of said nasal portion inwardly toward the ala of the user's nostril whereby retention, user comfort, and unobtrusiveness of said nasal portion are enhanced;

28. An eyeglass frame with a concealed nasal cannula  
15 assembly as set forth in Claim 22, wherein:

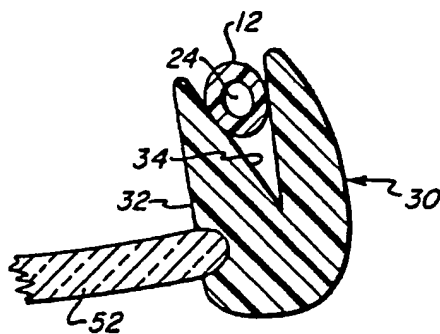
          said shaped means includes a bend in said lower end of said nasal portion through more than 180 degrees followed by a reverse bend such that said distal end is generally directed away from the inside surface of the ala and toward  
20 the center of the user's nostril when said cannula assembly is installed for use.



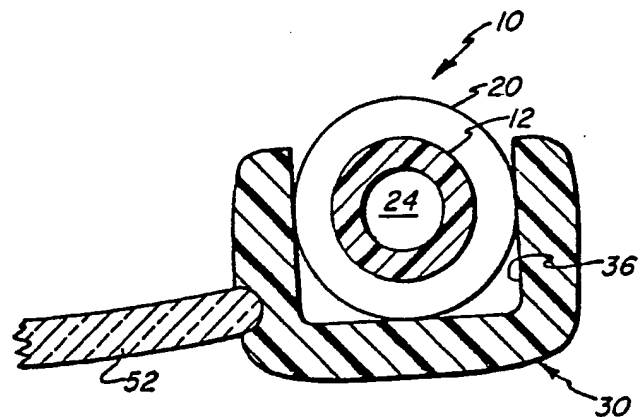
**FIG. 1**



**FIG. 2**



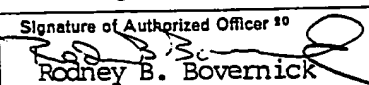
**FIG. 3**



**FIG. 4**

# INTERNATIONAL SEARCH REPORT

International Application No PCT/US86/02661

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>3</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC(4): G02C 11/00; A61M 15/08 U.S. CL. 351/158; 128/207.18		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>4</sup>		
Classification System	Classification Symbols	
U.S.	351/158; 128/204.12, 206.18, 207.13, 207.18, 201.12	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>		
Category <sup>6</sup>	Citation of Document, <sup>16</sup> with indication, where appropriate, of the relevant passages <sup>17</sup>	Relevant to Claim No. <sup>18</sup>
A	US, A, 2,168,705 (FRANCISCO ET AL) 08 AUGUST 1939 SEE ENTIRE DOCUMENT	1-21
A	US, A, 2,468,383 (TIFFANY) 26 APRIL 1949 SEE ENTIRE DOCUMENT	1-21
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><sup>15</sup> Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&amp;" document member of the same patent family</p> </div> </div>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search <sup>8</sup>	Date of Mailing of this International Search Report <sup>9</sup>	
09 FEBRUARY 1987	03 MAR 1987	
International Searching Authority <sup>1</sup>	Signature of Authorized Officer <sup>10</sup>	
ISA/US	 Rodney B. Bovernick	